

REMARKS/ARGUMENTS

Claims 31, 33-39, and 41-49 are presently pending in this application. Claims 31 and 39 have been amended, and claims 32 and 40 have been canceled, without prejudice. No new matter has been introduced as a result of the present amendments. Applicant respectfully requests entry of the amendments.

Claim 31 and 34-38 stand rejected under 35 U.S.C. §102(b) as being anticipated by *Lee* (US 5,401,676). Claim 39 stands rejected under 35 U.S.C. §102(e) as being anticipated by *Kumar* (US 5,763,997). Claims 32 and 33 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Lee* (US 5,401,676). Claims 40-49 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Kumar* (US 5,763,997). Applicant respectfully traverses the rejections.

Regarding independent claims 31 and 39, the amended claims recite an “emitting layer . . . comprised of a metal silicide, having a thickness between 50 and 3000 angstroms.” Neither *Lee* nor *Kumar* teach or suggest this feature. *Kumar* discloses a micro-tip (12) being comprised of a metal “such as molybdenum, or a semiconductor material such as silicon, or a combination of molybdenum and silicon” (col. 1, lines 56-58). While *Kumar* discloses a molybdenum-silicon combination, there is no teaching that the combination is in the form of a metal silicide. Alternately, *Kumar* discloses a micro-tip (12) “comprised of a submicro-tip (18) which may consist of such materials as a conductive metal (e.g., molybdenum), with layer (19) formed thereon. Layer (19) has typically comprised any well-known low work function material” (col. 2, lines 10-14). The “low work function material” is defined in *Kumar* as “a cermet, CVD (chemical vapor deposition) diamond films, aluminum nitride, gallium nitride, or amorphous diamond” (col. 2, lines 51-53). These materials disclosed in *Kumar* are not metal silicides as claimed in the present invention, and have materially different properties.

Lee discloses a metal silicide layer (40) at the boundary of the tip metal (47) and the silicon emitter (37) . . . formed in accordance with the kind of the gate metal, namely,

one of CrSi_2 , MoSi_2 , TaSi_2 , Wsi_2 , and ZrSi_2 ” (col. 4, lines 19-24). However, *Lee* also teaches that the metal silicide is formed *only on the tip* of the cone shaped emitter (col. 3, lines 10-13), and expressly disparages the prior art for using a metal silicide emitting layer over the entire tip (col. 2, lines 15-26). The metal silicide emitter layer in *Lee* is formed expressly for reinforcing the tip and to block permeation of the metal component to the insulating layers (col. 2, lines 5-8; col. 4, lines 24-38). Thus, *Lee* cannot teach or suggest the thickness levels claimed in the present invention, since the disclosure in *Lee* uses the metal silicide layer as a partial insulating region for the emitting tip.

In contrast, the present invention discloses a method, and the resulting claimed structure, for forming a sufficiently thin metal silicide emission layer on the entire tip of the emission site, wherein the sharp profile of the emission tip is retained (see specification, page 4, lines 13-21). Contrary to the Examiner’s assertion that the thickness layers provide no advantage or benefit, the disclosure clearly states that the sharp profile resulting from the thinned emitter layer enhances the electron emission from the tips and results in better performance for displays utilizing this feature (see specification page 8, lines 7-9). Accordingly, Applicant submits that the §102 and §103 rejections are improper, and respectfully requests that the rejections for claims 31 and 39, and all claims depending therefrom, be withdrawn. Furthermore, since *Lee* teaches the metal silicide layer as being useful only on the tip, the disclosure in *Lee* would could not be properly combined with *Kumar* under 35 U.S.C. §103, since *Kumar* which teaches the use of an emitter layer over the entire tip.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **“Version with markings to show changes made.”**

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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Version With Markings to Show Changes Made

Please REPLACE claim 31 as follows:

31. (AMENDED) A cathode tip for a cold cathode field emission display device, said tip comprising:

cathode material;

at least one emitter tip with a sharp profile for emitting electrons formed out of said cathode material; and

an emitting layer over each of said at least one tip, wherein said emitting layer is comprised of a metal silicide and has a thickness between 50 and 3000 angstroms.

Please REPLACE claim 39 as follows:

39. (AMENDED) A large area passive matrix cold cathode field emission display device comprising:

cathode material on a semiconductor substrate;

at least one emitter tip with a sharp profile for emitting electrons formed out of said cathode material;

an emitting layer over each of said at least one tip, wherein said emitting layer is comprised of a metal silicide and has a thickness between 50 and 3000 angstroms.